DOCUMENT RESUME

ED 264 405 CE 043 081

TITLE Mechanical Design Technology--Modified. (Computer Assisted Drafting, Computer Aided Design). Curriculum Grant 84/85.
INSTITUTION Schoolcraft Coll., Livonia, Mich.
PUB DATE 24 Aug 85
NOTE 55p.
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Associate Degrees; *College Programs; *Computer Oriented Programs; *Course Content; Course Descriptions; *Course Organization; Curriculum Development; *Drafting; Educational Facilities; Educational Needs; Equipment; Technical Occupations; Two Year Colleges; Units of Study
IDENTIFIERS *Computer Assisted Design; *Computer Assisted Drafting

ABSTRACT

This document is a curriculum guide for a program in mechanical design technology (computer-assisted drafting and design developed at Schoolcraft College, Livonia, Michigan). The program helps students to acquire the skills of drafters and to interact with electronic equipment, with the option of becoming efficient in the computer-aided preparation of drawings, design documents, and reports. The program leads to an associate degree. The curriculum guide outlines the courses to be included in the computer-aided design and drafting program, suggests employment options, provides goal statements, and identifies existing and needed program equipment. The guide also describes the classroom and laboratory settings needed, outlines specialty courses, suggests a sequence of courses, and includes a short description of the Schoolcraft College program evaluation system. (KC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

MI 8513302

OCT 17 1985

MECHANICAL DESIGN TECHNOLOGY - MODIFIED
(Computer Assisted Drafting, Computer Aided Design)

Curriculum Grant 84/85

ED264405

Submitted August 24, 1985

Schoolcraft College
Livonia, MI 48152

Louis A. Reibling, Ph.D.
Dean of Instruction

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CE043081

BEST COPY AVAILABLE

TABLE OF CONTENTS

PROGRAM IDENTIFIERS, CODE	PAGE	1
INTRODUCTION		1
IDENTIFICATION OF: 1) specialty courses		2-3
2) support courses		4-5
3) general education courses		6
EMPLOYMENT OPTIONS		6
PROGRAM GOAL STATEMENTS		7
IDENTIFICATION OF EXISTING PROGRAM EQUIPMENT		8-9
FACILITY EXPANSION		10
CLASSROOM/LABORATORY SETTINGS DESCRIBED		10
SPECIALTY COURSE OUTLINES WHICH INCLUDE:		11-39
1) course objectives		
2) course content		
3) learning activities		
4) method of evaluation		
PROGRAMS WITH COURSES LISTED BY SEMESTERS		40-45
SCHOOLCRAFT COLLEGE PROGRAM EVALUATION SYSTEMS		46
SCHOOLCRAFT COLLEGE CURRICULUM INSTRUCTION COMMITTEE		46
ADVISORY COMMITTEE MINUTES		47-51

PROGRAM IDENTIFIERS, CODE

15.0805

INTRODUCTION

To function efficiently in today's modern Drafting & Design facilities and within advancing technologies the acquired skills of drafters are only preparatory as each person more often is required to interact with electronic equipment. Computer Assisted Drafting & Design permits individuals the options of becoming very efficient in the preparation of drawings, design document and reports. C.A.D.D. is an efficient emerging occupation which is continually undergoing change. Drafting & Design work patterns have been modified to incorporate this newer method which more drafters can apply.

Realizing that some persons want to only acquire the skill phase of Drafting & Design, one-year certificate programs have been developed. Graduates will be employed as detailers or beginning drafters.

The Associate Degree two-year or three-year program provides employment for drafters and beginning designers various business, industrial, governmental and professional concerns.

SPECIALTY COURSES

CATALOG DESCRIPTIONS

*DRFG 100 BASIC PROJECTIONS (0-6) 3 Cr. Hrs.
Basic orthographic and axonometric projections using freehand and instrument drawing techniques will be covered. Emphasis will be placed on normal, inclined and oblique plane projection; deformaties of cylinders; auxiliary views, sections, lettering and drafting conventions.
PREREQUISITE: DRFG 51 or equivalent experience

*DRFG 104 PRODUCT DETAILING (0-6) 3 Cr. Hrs.
Course introduces the student to mechanical movements and dimensioning for interchangeability of parts. These concepts will then be applied to the drafting board where instrument drawings of gears, cams, linkages and fasteners will be made according to industrial standards.
PREREQUISITE: DRFG 100

*DRFG 108 TOOL DETAILING (0-6) 3 Cr. Hrs.
From assemblies of jigs, fixtures and fixed gages, detail drawings are made. Detailing includes measuring from an assembly drawing and constructing the necessary views with dimensions and complete specifications for construction.
PREREQUISITE: DRFG 104

DRFG 112 DESCRIPTIVE GEOMETRY (2-4) 3 Cr. Hrs.
Graphic representation and solution of space problems; fundamental principles of advanced orthographic projection: points, lines, planes and solids; auxiliary views; parallelism; perpendicularity; developments and intersections.
PREREQUISITE: DRFG 100, or DRFG 104, or ARCH 109 or consent of the department.

*DRFG 240 DIE DESIGN (0-6) 3 Cr. Hrs.
This course covers the development of press working tools such as cutting dies, piercing dies, forming dies and drawing dies. From the scrap strip to the assembly drawing, the designing procedure is analyzed.
PREREQUISITE: DRFG 108

*DRFG 241 JIG AND FIXTURE DESIGN (0-6) 3 Cr. Hrs.
Jig, fixture, gage and weldment designs are covered, with attention given to incline and oblique surfaces.
PREREQUISITE: DRFG 112, DRFG 108

*CAD 100 INTRODUCTION TO COMPUTER GRAPHICS (0-4) 2 Cr. Hrs.
In this course, traditional drafting techniques are applied to the computer. Familiarization with the computer work station and basic commands are covered. Emphasis will be placed on construction of two dimensional (2-D) computer drawings.
PREREQUISITE: DRFG 51 or equivalent

* New Courses

* CAD 110 THREE DIMENSIONAL TECHNIQUES (0-4) 2 Cr. Hrs.
In this course, drawings are developed on the cathode ray tube (CRT). The views are generated from the computer model which the student constructs. Topics will include sectional views, auxiliary views, isometric views, cones and intersections.
PREREQUISITE: CAD 100

* CAD 113 ELECTRICAL SCHEMATIC LAYOUTS (0-4) 2 Cr. Hrs.
After becoming familiar with standard symbols, line fonts, spacing practice and text information placement, the student will learn to make a proper schematic layout including placing of information in layers.
PREREQUISITE: CAD 100

* CAD 250 THREE DIMENSIONAL ASSEMBLIES (0-4) 2 Cr. Hrs.
The student will now learn to use the computer to construct assembly models. These models will then be tested on the computer for functional clearances.
PREREQUISITE: CAD 110

* CAD 241 COMPUTER GRAPHICS APPLICATIONS (0-4) 2 Cr. Hrs.
Advanced computer graphics techniques are covered. Topics such as surface generation, mesh creation, mass properties, spirals and section cutting are explored. Students will be encouraged to initiate their own projects.
PREREQUISITES: CAD 250

* New Courses

SUPPORTIVE COURSES

CATALOG DESCRIPTIONS

ELECT 81 DC FUNDAMENTALS (2-2) 2 Cr. Hrs.
Direct current flow theory. Provides lecture and lab experience dealing with resistors, meters, Ohm's law, series and parallel resistive circuits. Kirchoff's Law and power relationships.
COREQUISITE: ELECT 120

ELECT 126 ELECTRONIC FABRICATION AND ASSEMBLY (1-4) 3 Cr. Hrs.
Course will enable the student to generate documentation, fabricate and assemble electronics equipment.
PREREQUISITE: ELECT 116

MFG 210 HYDRAULICS PNEUMATICS (2-4) 3 Cr. Hrs.
Principles of hydraulics and pneumatics.

MFG 102 BASIC MACHINING, MEASUREMENTS AND MANUFACTURING PROCESSES (2-4) 3 Cr.Hrs.
Fundamental manufacturing processes. This course will teach fundamentals only, not machine operator skills. Particular emphasis will be on machines, tools and measurements to produce an end product.

MFG 103 MANUFACTURING THEORY AND MACHINE OPER. (2-4) 3 Cr. Hrs.
Operation of the toolroom lathe, tracer lathe, turret lathe, horizontal mill, vertical mill, surface grinder, shaper and other machine tools, toolroom and mass production procedures.
PREREQUISITE: MFG 102

MET 102 INTRODUCTION TO MATERIALS SCIENCE (2-2) 3 Cr. Hrs.
A qualitative introduction to the nature of metallic and non-metallic materials used in most industries. Topics include the elements, states of matter, bonding, crystallization, chemical, mechanical and physical properties of metallic, polymeric, ceramic and composite materials.

ELECT 111 AC FUNDAMENTALS (4-4) 5 Cr. Hrs.
Course content includes review of DC fundamentals, DC meters, network theorems, magnetism, magnetic units, electromagnetic induction, alternating voltage and current, inductance, inductive reactance, inductive circuits, capacitance, capacitive reactance, capacitive circuits, alternating current circuits, complex numbers, resonance, time constants, and passive filters. The laboratory gives experience in the use of the oscilloscope and other widely applied instruments which demonstrate the principles taught in the classroom. A working knowledge of algebra is recommended.
PREREQUISITE: MATH 51 or 1 year of high school algebra, ELECT 81, ELECT 120
COREQUISITE: ELECT 121

MET 114 ADVANCED MATERIALS AND APPLICATIONS (3-0- 3 Cr.Hrs
A course in materials applications covering ferrous and non-ferrous alloys, powdered metals, glass, rubber, and plastics. Each are reviewed with respect to their advantages and disadvantages, methods of fabrication and joining, and specific industrial applications both current and future. Unique applications such as magnetic devices and lasers are also reviewed.
PREREQUISITE: MET 102

COMPS 125 TECHNICAL PROGRAMMING (2-2) 3 Cr. Hrs.
The application of the Basic Language to solve some typical technical problems. Including the documentation, writing and testing of programs that use the most commonly used commands.

The student will use the computer to solve problems related to their degree programs. Assignments on plotting, data files and disk files will also be covered.

PREREQUISITE: Student must be enrolled in a technical program that requires BASIC.

GENERAL EDUCATION COURSES

CATALOG DESCRIPTIONS

ENG ___ Six Hours

MATH ___ Eight Hours

PHYS 51 BASIC PHYSICS (4-1) 4 Cr. Hrs.
Mechanics, sound, heat, electricity, light and moders physics. For those students who have had no previous course in physics or need review of the subject to prepare for college physics.
PREREQUISITE: One hear of high school algebra or MATH 51.

PHYS 181 GENERAL PHYSICS (4-2) 4 Cr. Hrs.
Mechanics, fluids, energy relationship, heat, and sound. Not for engineering students or physics major.

PHYS 182 GENERAL PHYSICS (4-2) 4 Cr. Hrs.
Continuation of PHYS 181. Magnetism, electricity, light and modern physics. Not for engineering students or physics majors.
PREREQUISITE: PHYS 181

POL S 105 SURVEY OF AMERICAN GOVERNMENT (3-0) 3 Cr. Hrs.
Survey of the American political system, including an analysis of decision makers, power and controversial issues at the national, state and local governmental levels.

EMPLOYMENT OPTIONS

For the student graduating from the Associate Degree programs, they may seek employment as drafters and beginning designers in various business, industrial governmental and professional concerns.

For the student graduating from the one-year certificate programs, they may seek employment as detailers or beginning drafters.

PROGRAM GOAL STATEMENTS

Computer Assisted Drafting (Associate Degree)

Computer Assisted Design (Associate Degree)

Drafting-Technical (One Year Certificate)

Drafting-Electro-Mechanical (One Year Certificate)

1. To prepare new students who may be without prior work experiences, to enter directly in the occupation of drafting and design.

   A. Develop skills in traditional fundamentals.

      1. Use of basic drawing tools.
      2. Orthographic projection.
      3. Dimensioning.

   B. Develop skills in the use of computer-aided Drafting or Design equipment.

2. To upgrade skills of currently employed drafters and designers.

   A. Computer aided drafting design (C.A.D.D.)
   B. Tolerancing.
   C. Gaging.
   D. Descriptive geometry.
   E. New emerging skills.
   F. New equipment.

EXISTING PROGRAM EQUIPMENT
(Prior to 1985)

QUANTITY	TYPE OF EQUIPMENT
24	5' Drafting Tables
2	Stations - IBM Fastdraft CAD System
2	Stations - Prime CAD 3D System
1	White Print Machine
3	Print Storage Cabinets
1	Light Table

NEW EQUIPMENT 85/86

TYPE	NUMBER
Adjustable chairs with back rests, foot rests, casters	48
CAD work station tables with 2 axis adjustments	12
2-D CAD Work Stations	12
Printer Plotters	4
3-D CAD work Stations with Graphics	2
Software Packages	3

FACILITY EXPANSION

It is recognized that our present facilities are not adequate to support our CAD program. Currently we have two drafting rooms to support the conventional drafting program and a small computer room to support our CAD program. Our growth in CAD requires us to expand our current computer room to facilitate 12 computer work stations that will need to expand to 24 work stations by 1990.

CLASSROOM/LABORATORY SETTINGS DESCRIBED

CAD will be included in all of our drafting programs. Equipment will be located in rooms T100, T110, T115, & T120. Some modifications of T100 are necessary, namely a partition, to house the twelve (12) Prime 2-D Network CAD work stations. We are also requesting additional light shields for the work stations that are located in the other laboratories. The new facilities will incorporate CAD into 3600 square feet of our laboratory facility. The T100 laboratory will function as an open laboratory and for special classroom instruction. It will serve as the prime facility to take care of the current work which is the Principles of CAD. It is anticipated that a laboratory assistant may be necessary to monitor the open laboratory sessions.

SCHOOLCRAFT COLLEGE

Course Description Form:

Prepared by:

L. J. Bigos Date 8/1/85

Date

Date

Reviewed by:

Date

Date

Date

Date

Date

DEPT. COURSE NO: DRFG 100

COURSE TITLE: Basic Projections

Lec. Hrs. 0 Lab. Hrs. 6 Credit Hrs. 3

CATALOG DESCRIPTION: (Indicate in paragraph form what will be taught in the course. Include prerequisites for the course.)

Basic orthographic and axonometric projections using freehand and instrument drawing techniques will be covered. Emphasis will be placed on normal, inclined and oblique plane projection; deformaties of cylinders; auxiliary views, sections, lettering and drafting conventions.

Prerequisite: DRFG 51 or equivalent experience

COURSE OBJECTIVES: (Begin each course objective with "the student will be able to . . . ".)

1. The student will be able to make freehand sketches of a part showing normal views.
2. The student will be able t: letter using freehand techniques.

3. The student will be able to use drafting instruments to construct shop drawings.

4. The student will be able to make a three-view drawing of a part viewing it from the top, front and side.

5. The student will be able to construct sectional views of a part showing interior construction.

6. The student will be able to construct auxiliary views showing the true size and shape of slanted planes.

7. The student will be able to construct geometric shapes and locate tangent points.

8. The student will be able to construct isometric drawings which show a pictorial drawing of the part.

Course Description Form (continued)

COURSE CONTENT/OUTLINE: (Write the major topics for the course. Under each topic include the units.)

I Course Introduction

- A. Evaluation
- B. Course Outline
- C. Graphic Language
- D. Instruments
- E. Materials

II Freehand Lettering

- A. Lettering Techniques
- B. Lettering Leads
- C. Guide Lines
- D. Lettering Guides
- E. Slant Lettering
- F. Vertical Lettering

III Geometric Constructions

- A. Points and Lines
- B. Angles
- C. Circles and Arcs
- D. Bisections
- E. Tangents
- F. Polygons
- G. Solids
- H. Ellipses Construction

IV Shape Sketching

- A. Sketching Materials
- B. Sketch Types
- C. Line Techniques
- D. Ellipses Sketching
- E. Pictorial Sketching
- F. Standard Views

V Multi View Drawings

A. Top, front and side views
B. Partial views
C. Normal surfaces
D. Incline surfaces
E. Oblique surfaces
F. Round surfaces
G. Intersecting surfaces

VI Sectional Views

A. Full sections
B. Half sections
C. Broken out sections
D. Removed sections
E. Revolved sections
F. Offset sections
G. Aligned sections
H. Cutting planes

VII Auxiliary Views

A. Reference planes
B. Dihedral angles
C. Plotted curves
D. Partial auxiliary views
E. Auxiliary sections
F. Successive auxiliary views

VIII Isometric Drawings

A. Projection methods
B. Isometric drawing procedure
C. Oblique surfaces
D. Box construction
E. Irregular objects
F. Ellipses construction
G. Ellipse guides
H. Intersections
I. Isometric sectioning

Course Description Form (continued)

METHOD OF EVALUATION: (Indicate how the competencies achieved will be translated into the grading system.)

To receive a grade of "A" the drawing, a final hard copy, must be of the highest quality. The drawing must not have any flaws in line contrast, absolute accuracy in dimensioning, and precise spacing of views and notes.

To receive a grade of "B" the drawing, a final hard copy, must have accurate dimensions, excellent line contrast, and reasonable spacing of views and notes.

To receive a grade of "C" the drawing, a final hard copy, has the minimum quality of technique; poorly spaced views, inaccurate structure of clarity of notes; lacks cleanliness, sharp corners, tangent points, and has long extension lines. Although the drawing exhibits sloppy technique, however, if the dimensions are accurate, this could be acceptable.

To receive a grade of "D" the drawing, a final hard copy, will exhibit overall poor quality. It has misleading descriptive notes, poor placement of views, and extra lines that add clutter to the drawing. This drawing may or may not meet the minimum requirements of acceptability in industry.

To receive a grade of "E" the drawing, a final hard copy, will show such unacceptable qualities as erroneous construction dimensions, views lacking proper alignment and an obvious lack of effort and understanding of what is minimum acceptable quality.

COURSE SYLLABUS: (This should be a companion document distributed to the students on the first day of class. It should include the Instructional Goals, Performance objectives and specific method of evaluation.)

SCHOOLCRAFT COLLEGE

Course Description Form:

Prepared by:

L. J. Bigos Date 8/1/85

Date

Date

Reviewed by:

Date 8/28/85

Date 8/28/85

Date

Date

Date

DEPT. COURSE NO: DRFG 104

COURSE TITLE: Product Detailing

Lec. Hrs. 0 Lab. Hrs. 6 Credit Hrs. 3

CATALOG DESCRIPTION: (Indicate in paragraph form what will be taught in the course. Include prerequisites for the course.)

This course introduces the student to mechanical movements and dimensioning for interchangeability of parts. These concepts will then be applied to the drafting board where instrument drawings of gears, cams, linkages and fasteners will be made according to industrial standards.

Prerequisite: DRFG 100

COURSE OBJECTIVES: (Begin each course objective with "the student will be able to . . . ".)

1. The student will be able to visualize and interpret movement of parts on a drawing.
2. The student will be able to dimension parts to effect design function.
3. The student will be able to layout and dimension spur gears.

4. The student will be able to layout and dimension bevel gears.
5. The student will be able to layout and dimension a disc cam.
6. The student will be able to draw various types of fasteners.
7. The student will be able to interpret thread charts.

Course Description Form (continued)

COURSE CONTENT/OUTLINE: (Write the major topics for the course. Under each topic include the units.)

I Dimensioning

- A. Using the decimal system
- B. Using the fractional system
- C. Using the metric system

II Tolerancing

- A. Limit dimensioning
- B. Geometric tolerancing

III Gearing

- A. Spur gears
- B. Bevel gears
- C. Worm gears

IV Cams

A. Disc cam
   1. displacement diagram
   2. cam profile
B. Drum cam
   1. displacement diagram
   2. cam profile
C. Toe and wiper cam
   1. displacement diagram
   2. cam profile

V Fasteners

A. Screw threads
B. Thread symbols
C. Thread notes
D. Bolts, studs and screws
E. Tapped holes
F. Locknuts and locking devices

Course Description Form (continued)

METHOD OF EVALUATION: (Indicate how the competencies achieved will be translated into the grading system.)

To receive a grade of "A" the drawing, a final hard copy, must be of the highest quality. The drawing must not have any flaws in line contrast, absolute accuracy in dimensioning, and precise spacing of views and notes.

To receive a grade of "B" the drawing, a final hard copy, must have accurate dimensions, excellent line contrast, and reasonable spacing of views and notes.

To receive a grade of "C" the drawing, a final hard copy, has the minimum quality of technique; poorly spaced views, inaccurate structure of clarity of notes; lacks cleanliness, sharp corners, tangent points, and has long extension lines. Although the drawing exhibits sloppy technique, however, if the dimensions are accurate, this could be acceptable.

To receive a grade of "D" the drawing, a final hard copy, will exhibit overall poor quality. It has misleading descriptive notes, poor placement of views, and extra lines that add clutter to the drawing. This drawing may or may not meet the minimum requirements of acceptability in industry.

To receive a grade of "E" the drawing, a final hard copy, will show such unacceptable qualities as erroneous construction dimensions, views lacking proper alignment and an obvious lack of effort and understanding of what is minimum acceptable quality.

COURSE SYLLABUS: (This should be a companion document distributed to the students on the first day of class. It should include the Instructional Goals, Performance objectives and specific method of evaluation.)

SCHOOLCRAFT COLLEGE

Course Description Form:

Prepared by:

L. J. Bigos Date 8/1/85

Date

Date

Reviewed by:

Date 8/28/85

Date 8/28/85

Date

Date

Date

DEPT. COURSE NO: DRFG 108

COURSE TITLE: Tool Detailing

Lec. Hrs. 0 Lab. Hrs. 6 Credit Hrs. 3

CATALOG DESCRIPTION: (Indicate in paragraph form what will be taught in the course. Include prerequisites for the course.)

From assemblies of jigs, fixtures and fixed gages, detail drawings are made. Detailing includes measuring from an assembly drawing and constructing the necessary views with dimensions and complete specifications for construction.

Prerequisite: DRFG 104

COURSE OBJECTIVES: (Begin each course objective with "the student will be able to . . . ".)

1. The student will be able to construct shop drawings by measuring details from the assembly drawing and show true size, shape, dimensions and specifications for construction.

2. The student will be able to complete work on assembly drawings by lettering a stock list and placing identifying balloons.

3. The student will be able to detail drill jigs.

4. The student will be able to detail milling fixtures.

5. The student will be able to dimension welded constructed details.

6. The student will be able to select stock sizes from a commercial stock catalog.

7. The student will be able to select commonly used heat treating processes.

8. The student will be able to calculate dimensions for fixed gages.

Course Description Form (continued)

COURSE CONTENT/OUTLINE: (Write the major topics for the course. Under each topic include the units.)

I Detailing Procedure

- A. View selection
- B. Tool dimensioning
- C. Nomenclature information

II Assembly Drawing Completion

- A. Identifying balloons
- B. Stock listing
- C. Steel selection sizes
- D. Assembly balloons

III Welded Construction Dimensioning

- A. View selection
- B. Nomenclature information
- C. Stock size selection

IV Drill Jig Detailing

V Milling Fixture Detailing

VI Fixed Gage Dimensioning

A. Plug gage
B. Progressive plug gage
C. Ring gage
D. Flush pin gage

Course Description Form (continued)

METHOD OF EVALUATION: (Indicate how the competencies achieved will be translated into the grading system.)

To receive a grade of "A" the drawing, a final hard copy, must be of the highest quality. The drawing must not have any flaws in line contrast, absolute accuracy in dimensioning, and precise spacing of views and notes.

To receive a grade of "B" the drawing, a final hard copy, must have accurate dimensions, excellent line contrast, and reasonable spacing of views and notes.

To receive a grade of "C" the drawing, a final hard copy, has the minimum quality of technique; poorly spaced views, inaccurate structure of clarity of notes; lacks cleanliness, sharp corners, tangent points, and has long extension lines. Although the drawing exhibits sloppy technique, however, if the dimensions are accurate, this could be acceptable.

To receive a grade of "D" the drawing, a final hard copy, will exhibit overall poor quality. It has misleading descriptive notes, poor placement of views, and extra lines that add clutter to the drawing. This drawing may or may not meet the minimum requirements of acceptability in industry.

To receive a grade of "E" the drawing, a final hard copy, will show such unacceptable qualities as erroneous construction dimensions, views lacking proper alignment and an obvious lack of effort and understanding of what is minimum acceptable quality.

COURSE SYLLABUS: (This should be a companion document distributed to the students on the first day of class. It should include the Instructional Goals, Performance objectives and specific method of evaluation.)

SCHOOLCRAFT COLLEGE

Course Description Form:

Prepared by:

LJB L. J. Bigos Date 8/1/85

Date

Date

Reviewed by:

Date 9/21/85

Date 8/28/85

Date

Date

Date

DEPT. COURSE NO: DRFG 240

COURSE TITLE: Die Design

Lec. Hrs. 0 Lab. Hrs. 6 Credit Hrs. 3

CATALOG DESCRIPTION: (Indicate in paragraph form what will be taught in the course. Include prerequisites for the course.)

This course covers the development of press working tools such as cutting dies, piercing dies, forming dies and drawing dies. From the scrap strip to the assembly drawing, the designing procedure is analyzed.

Prerequisite: DRFG 108

COURSE OBJECTIVES: (Begin each course objective with "the student will be able to . . . ".)

1. The student will be able to develop a scrap strip.
2. The student will be able to design a cutting die.

3. The student will be able to design a piercing die.

4. The student will be able to design a forming die.

5. The student will be able to design a draw die.

Course Description Form (continued)

COURSE CONTENT/OUTLINE: (Write the major topics for the course. Under each topic include the units.)

I Introduction To Pressworking Tools

- A. Press data
- B. Stock handling equipment
  - 1. Hand feeding
  - 2. Roll feeding
- C. Sheet metal dies
  - 1. Cutting dies
  - 2. Forming dies

II The Development Of Scrap Strips

- A. Material selection
- B. Stage development
- C. Stock stop location
- D. Trigger location
- E. End gaging location
- F. Margin minimums
- G. Economical stock use

III Steps To Design A Die

A. How to layout a scrap strip
B. How to design die blocks
C. How to design blanking punches
D. How to design piercing punches
E. How to design punch plates
F. How to design pilots
G. How to design gages
H. How to design finger stops
I. How to design automatic stops
J. How to design strippers
K. How to apply fasteners
L. How to select die springs
M. How to select die sets
N. How to list a bill of materials

IV How To Layout A Cutting Die

V How To Layout A Piercing Die

VI How To Layout A Form Die

VI How To Layout A Draw Die

Course Description Form (continued)

METHOD OF EVALUATION: (Indicate how the competencies achieved will be translated into the grading system.)

To receive a grade of "A" the drawing, a final hard copy, must be of the highest quality. The drawing must not have any flaws in line contrast, absolute accuracy in dimensioning, and precise spacing of views and notes.

To receive a grade of "B" the drawing, a final hard copy, must have accurate dimensions, excellent line contrast, and reasonable spacing of views and notes.

To receive a grade of "C" the drawing, a final hard copy, has the minimum quality of technique; poorly spaced views, inaccurate structure of clarity of notes; lacks cleanliness, sharp corners, tangent points, and has long extension lines. Although the drawing exhibits sloppy technique, however, if the dimensions are accurate, this could be acceptable.

To receive a grade of "D" the drawing, a final hard copy, will exhibit overall poor quality. It has misleading descriptive notes, poor placement of views, and extra lines that add clutter to the drawing. This drawing may or may not meet the minimum requirements of acceptability in industry.

To receive a grade of "E" the drawing, a final hard copy, will show such unacceptable qualities as erroneous construction dimensions, views lacking proper alignment and an obvious lack of effort and understanding of what is minimum acceptable quality.

COURSE SYLLABUS: (This should be a companion document distributed to the students on the first day of class. It should include the Instructional Goals, Performance objectives and specific method of evaluation.)

SCHOOLCRAFT COLLEGE

Course Description Form:

Prepared by:

L. J. Bigos Date 8/1/85

Date

Date

Reviewed by:

Date 8/26/85

Date 8/26/85

Date

Date

Date

DEPT. COURSE NO: DRFG 241

COURSE TITLE: Jig and Fixture Design

Lec. Hrs. 0 Lab. Hrs. 6 Credit Hrs. 3

CATALOG DESCRIPTION: (Indicate in paragraph form what will be taught in the course. Include prerequisites for the course.)

Jig, fixture, gage and weldment designs are covered, with attention given to incline and oblique surfaces.

Prerequisite: DRFG 112, DRFG 108

COURSE OBJECTIVES: (Begin each course objective with "the student will be able to . . . ".)

1. The student will be able to tip a part into machining positions.
2. The student will be able to follow a design procedure for designing a drill jig.
3. The student will be able to follow a design procedure for designing a milling fixture.

4. The student will be able to follow a design procedure for designing weldments.

5. The student will be able to apply the use of construction hole designs.

6. The student will be able to apply the use of tooling ball construction designs.

7. The student will be able to have an opportunity to create original designs.

Course Description Form (continued)

COURSE CONTENT/OUTLINE: (Write the major topics for the course. Under each topic include the units.)

I Design A Drill Jig Which Includes Drilled Holes In A Slanted Surface.

- A. Make some sketches
- B. Layout a drill jig according to established procedure
- C. Detail all non-standard details
- D. Complete the layout with stocklist, balloons and assembly dimensions.

II. Design A Milling Fixture Which Includes An Oblique Machined Surface

- A. Analyze the part print
- B. Draw views of the part that places it in machining position
- C. Make some sketches of the fixture
- D. Layout the milling fixture according to established procedure
- E. Detail all non-standard details
- F. Complete the layout with stocklist, balloons and assembly dimensions.

III Analyze Weldment Designs

A. Analyze stresses
B. Fabricate the weldment
C. Use the rule for dimensioning weldments.
D. Choose the proper stock
E. Recommend heat treating processes

IV Analyze Creation Of Designs

A. Discuss design concepts
B. Explain the design process

Course Description Form (continued)

METHOD OF EVALUATION: (Indicate how the competencies achieved will be translated into the grading system.)

To receive a grade of "A" the drawing, a final hard copy, must be of the highest quality. The drawing must not have any flaws in line contrast, absolute accuracy in dimensioning, and precise spacing of views and notes.

To receive a grade of "B" the drawing, a final hard copy, must have accurate dimensions, excellent line contrast, and reasonable spacing of views and notes.

To receive a grade of "C" the drawing, a final hard copy, has the minimum quality of technique; poorly spaced views, inaccurate structure of clarity of notes; lacks cleanliness, sharp corners, tangent points, and has long extension lines. Although the drawing exhibits sloppy technique, however, if the dimensions are accurate, this could be acceptable.

To receive a grade of "D" the drawing, a final hard copy, will exhibit overall poor quality. It has misleading descriptive notes, poor placement of views, and extra lines that add clutter to the drawing. This drawing may or may not meet the minimum requirements of acceptability in industry.

To receive a grade of "E" the drawing, a final hard copy, will show such unacceptable qualities as erroneous construction dimensions, views lacking proper alignment and an obvious lack of effort and understanding of what is minimum acceptable quality.

COURSE SYLLABUS: (This should be a companion document distributed to the students on the first day of class. It should include the Instructional Goals, Performance objectives and specific method of evaluation.)

SCHOOLCRAFT COLLEGE

Course Description Form:

Prepared by:

LJB L. J. Bigos Date 8/1/85

_____ Date _____

_____ Date _____

Reviewed by:

_____ Date 8/29/85

_____ Date 9/5/85

_____ Date _____

_____ Date _____

_____ Date _____

DEPT. COURSE NO: CAD 100

COURSE TITLE: Introduction to Computer Graphics

Lec. Hrs. 0 Lab. Hrs. 4 Credit Hrs. 2

CATALOG DESCRIPTION: (Indicate in paragraph form what will be taught in the course. Include prerequisites for the course.)

In this course traditional drafting techniques are applied to the computer. Familiarization with the computer work station and basic commands are covered. Emphasis will be placed on construction of two dimensional (2-D) computer drawings.

Prerequisite: DRFG 51 or equivalent

COURSE OBJECTIVES: (Begin each course objective with "the student will be able to . . . ".)

1. The student will be able to operate the equipment at a computer graphics work station.
2. The student will be able to construct entities on a cathode ray tube (CRT) by using screen control commands.

3. The student will be able to retrieve and store data in a data bank.

4. The student will be able to transfer dimensioned drawings from the computer onto hardcopy, using peripheral equipment, such as digitizer or plotter controlled by computer.

Course Description Form (continued)

COURSE CONTENT/OUTLINE: (Write the major topics for the course. Under each topic include the units.)

I Two Dimensional (2-D) Computer Graphics

A. Work station equipment
B. Computer graphics terms
C. Computer interfaces
D. Graphics processor
E. Modem channels
F. Plotter operation
G. Software equipment

II Screen Control Commands

A. Lines circles and arcs
B. Grids and coordinates
C. Tangents points and intersections
D. Dimensioning and text insertions
E. Editing techniques
F. Crosshatching methods
G. Line fonts
H. Mirroring and zooming
I. Moving and rotating
J. Layering concepts
K. Plotting procedures

III Drawing Construction

A. Normal surfaces
B. Slant surfaces
C. Round surfaces
D. Oblique surfaces

Course Description Form (continued)

METHOD OF EVALUATION: (Indicate how the competencies achieved will be translated into the grading system.)

To receive a grade of "A" the drawing, a final hard copy, must be of the highest quality. The drawing must not have any flaws in line contrast, absolute accuracy in dimensioning, and precise spacing of views and notes.

To receive a grade of "B" the drawing, a final hard copy, must have accurate dimensions, excellent line contrast, and reasonable spacing of views and notes.

To receive a grade of "C" the drawing, a final hard copy, has the minimum quality of technique; poorly spaced views, inaccurate structure of clarity of notes; lacks cleanliness, sharp corners, tangent points, and has long extension lines. Although the drawing exhibits sloppy technique, however, if the dimensions are accurate, this could be acceptable.

To receive a grade of "D" the drawing, a final hard copy, will exhibit overall poor quality. It has misleading descriptive notes, poor placement of views, and extra lines that add clutter to the drawing. This drawing may or may not meet the minimum requirements of acceptability in industry.

To receive a grade of "E" the drawing, a final hard copy, will show such unacceptable qualities as erroneous construction dimensions, views lacking proper alignment and an obvious lack of effort and understanding of what is minimum acceptable quality.

COURSE SYLLABUS: (This should be a companion document distributed to the students on the first day of class. It should include the Instructional Goals, Performance objectives and specific method of evaluation.)

SCHOOLCRAFT COLLEGE

Course Description Form:

Prepared by:

L. J. Bigos Date 8/2/85

Date

Date

Reviewed by:

Date 8/24/85

Date 8/28/85

Date

Date

Date

DEPT. COURSE NO: CAD 110

COURSE TITLE: Three Dimensional Techniques

Lec. Hrs. 0 Lab. Hrs. 4 Credit Hrs. 2

CATALOG DESCRIPTION: (Indicate in paragraph form what will be taught in the course. Include prerequisites for the course.)

In this course drawings are developed on the cathode ray tube (CRT). The views are generated from the computer model which the student constructs. Topics will include sectional views, auxiliary views, isometric views, cones and intersections.

Prerequisite: CAD 100

COURSE OBJECTIVES: (Begin each course objective with "the student will be able to . . . ".)

1. The student will be able to generate computer models using modeling principles on a cathode ray tube (CRT).
2. The student will be able to generate computer models having sectional views.

3. The student will be able to generate computer models having auxiliary views.

4. The student will be able to generate computer models that have cones.

5. The student will be able to generate computer models that have intersections.

Course Description Form (continued)

COURSE CONTENT/OUTLINE: (Write the major topics for the course. Under each topic include the units.)

I Analyze The Principle Of Modeling (3-D)

- A. View boxes
- B. Text elements
- C. Model generation
- D. Isometric views
  1. Construction procedure
  2. Entity insertion
  3. Automatic hidden line removal
  4. Editing

II Construct Models Having Sectional Views

III Construct Models Having Auxiliary Views

IV Construct Models Having Cones

V Construct Models Having Intersections

Course Description Form (continued)

METHOD OF EVALUATION: (Indicate how the competencies achieved will be translated into the grading system.)

To receive a grade of "A" the drawing, a final hard copy, must be of the highest quality. The drawing must not have any flaws in line contrast, absolute accuracy in dimensioning, and precise spacing of views and notes.

To receive a grade of "B" the drawing, a final hard copy, must have accurate dimensions, excellent line contrast, and reasonable spacing of views and notes.

To receive a grade of "C" the drawing, a final hard copy, has the minimum quality of technique; poorly spaced views, inaccurate structure of clarity of notes; lacks cleanliness, sharp corners, tangent points, and has long extension lines. Although the drawing exhibits sloppy technique, however, if the dimensions are accurate, this could be acceptable.

To receive a grade of "D" the drawing, a final hard copy, will exhibit overall poor quality. It has misleading descriptive notes, poor placement of views, and extra lines that add clutter to the drawing. This drawing may or may not meet the minimum requirements of acceptability in industry.

To receive a grade of "E" the drawing, a final hard copy, will show such unacceptable qualities as erroneous construction dimensions, views lacking proper alignment and an obvious lack of effort and understanding of what is minimum acceptable quality.

COURSE SYLLABUS: (This should be a companion document distributed to the students on the first day of class. It should include the Instructional Goals, Performance objectives and specific method of evaluation.)

SCHOOLCRAFT COLLEGE

Course Description Form:

Prepared by:

LJB L. J. Bigos Date 8/2/85

_____ Date _____

_____ Date _____

Reviewed by:

_____ Date 8/29/85

_____ Date 8/29/85

_____ Date _____

_____ Date _____

_____ Date _____

DEPT. COURSE NO: CAD 250

COURSE TITLE: Three Dimensional Assemblies

Lec. Hrs. 0 Lab. Hrs. 4 Credit Hrs. 2

CATALOG DESCRIPTION: (Indicate in paragraph form what will be taught in the course. Include prerequisites for the course.)

The student will now learn to use the computer to construct assembly models. These models will then be tested on the computer for functional clearances.

Prerequisite: CAD 110

COURSE OBJECTIVES: (Begin each course objective with "the student will be able to . . . ".)

1. The student will be able to create assembly models by positioning previously generated singular models within one or more viewing boxes.

2. The student will be able to test models for functional clearances.

3. The student will be able to print on a plotter hard copies of the drawings.

Course Description Form (continued)

COURSE CONTENT/OUTLINE: (Write the major topics for the course. Under each topic include the units.)

I Construct Individual Models That Are Part Of An Assembly And Place Them In A Data File.

II Recall Previously Generated Model Details And Position Them In A Assembly.

III Test The Assembly Model For Proper Functional Clearances.

IV Complete The Shop Drawing Assembly With Notes, And Specifications.

V Make A Hard Copy Of The Drawings.

Course Description Form (continued)

METHOD OF EVALUATION: (Indicate how the competencies achieved will be translated into the grading system.)

To receive a grade of "A" the drawing, a final hard copy, must be of the highest quality. The drawing must not have any flaws in line contrast, absolute accuracy in dimensioning, and precise spacing of views and notes.

To receive a grade of "B" the drawing, a final hard copy, must have accurate dimensions, excellent line contrast, and reasonable spacing of views and notes.

To receive a grade of "C" the drawing, a final hard copy, has the minimum quality of technique; poorly spaced views, inaccurate structure of clarity of notes; lacks cleanliness, sharp corners, tangent points, and has long extension lines. Although the drawing exhibits sloppy technique, however, if the dimensions are accurate, this could be acceptable.

To receive a grade of "D" the drawing, a final hard copy, will exhibit overall poor quality. It has misleading descriptive notes, poor placement of views, and extra lines that add clutter to the drawing. This drawing may or may not meet the minimum requirements of acceptability in industry.

To receive a grade of "E" the drawing, a final hard copy, will show such unacceptable qualities as erroneous construction dimensions, views lacking proper alignment and an obvious lack of effort and understanding of what is minimum acceptable quality.

COURSE SYLLABUS: (This should be a companion document distributed to the students on the first day of class. It should include the Instructional Goals, Performance objectives and specific method of evaluation.)

SCHOOLCRAFT COLLEGE

Course Description Form:

Prepared by:

L. J. Bigos Date 8/2/85

Date

Date

Reviewed by:

Date 8/26/85

Date 9/27/85

Date

Date

Date

DEPT. COURSE NO: CAD 241

COURSE TITLE: Computer Graphics Applications

Lec. Hrs. 0 Lab. Hrs. 4 Credit Hrs. 2

CATALOG DESCRIPTION: (Indicate in paragraph form what will be taught in the course. Include prerequisites for the course.)

Advanced computer graphics techniques are covered. Topics such as surface generation, mesh creation, mass properties, spirals and section cutting are explored. Students will be encouraged to initiate their own projects.

Prerequisite: CAD 240

COURSE OBJECTIVES: (Begin each course objective with "the student will be able to . . . ".)

1. The student will be able to handle complex computer graphics techniques.
2. The student will be able to generate surfaces.
3. The student will be able to create a mesh.

4. The student will be able to calculate mass properties.

5. The student will be able to construct spirals.

6. The student will be able to cut a section.

7. The student will be able to initiate projects.

Course Description Form (continued)

COURSE CONTENT/OUTLINE: (Write the major topics for the course. Under each topic include the units.)

I Computer Graphics Application

A. Product Design
B. Tool Design
C. Electrical schematics
D. Testing
E. Emerging new uses

II Surface Generation Techniques

III Mesh Creation Techniques

IV Mass Properties Calculations

V Section Cutting Principles

VI Spiral Construction

Course Description Form (continued)

METHOD OF EVALUATION: (Indicate how the competencies achieved will be translated into the grading system.)

To receive a grade of "A" the drawing, a final hard copy, must be of the highest quality. The drawing must not have any flaws in line contrast, absolute accuracy in dimensioning, and precise spacing of views and notes.

To receive a grade of "B" the drawing, a final hard copy, must have accurate dimensions, excellent line contrast, and reasonable spacing of views and notes.

To receive a grade of "C" the drawing, a final hard copy, has the minimum quality of technique; poorly spaced views, inaccurate structure of clarity of notes; lacks cleanliness, sharp corners, tangent points, and has long extension lines. Although the drawing exhibits sloppy technique, however, if the dimensions are accurate, this could be acceptable.

To receive a grade of "D" the drawing, a final hard copy, will exhibit overall poor quality. It has misleading descriptive notes, poor placement of views, and extra lines that add clutter to the drawing. This drawing may or may not meet the minimum requirements of acceptability in industry.

To receive a grade of "E" the drawing, a final hard copy, will show such unacceptable qualities as erroneous construction dimensions, views lacking proper alignment and an obvious lack of effort and understanding of what is minimum acceptable quality.

COURSE SYLLABUS: (This should be a companion document distributed to the students on the first day of class. It should include the Instructional Goals, Performance objectives and specific method of evaluation.)

SCHOOLCRAFT COLLEGE

Course Description Form:

Prepared by:

L. J. Bigos Date 8/2/85

Date

Date

Reviewed by:

Date 8/29/85

Date 8/29/85

Date

Date

Date

DEPT. COURSE NO: CAD 113

COURSE TITLE: Electrical Schematic Layouts

Lec. Hrs. 0 Lab. Hrs. 4 Credit Hrs. 2

CATALOG DESCRIPTION: (Indicate in paragraph form what will be taught in the course. Include prerequisites for the course.)

After becoming familiar with standard symbols, line fonts, spacing practice and text information placement, the student will learn to make a proper schematic layout including placing of information in layers.

Prerequisite: CAD 100

COURSE OBJECTIVES: (Begin each course objective with "the student will be able to . . . ".)

1. The student will be able to construct a schematic layout from a sketch.
2. The student will be able to call up standard symbols from a library and apply these to a schematic drawing.

3. The student will be able to create a library of symbols and notes that can be applied to a schematic drawing.

4. The student will be able to decide on spacing and placement of information in layers.

5. The student will be able to make a hard copy on a plotter.

6. The student will be able to store and recall data from a data bank.

Course Description Form (continued)

COURSE CONTENT/OUTLINE: (Write the major topics for the course. Under each topic include the units.)

I Standard Symbols

- A. Electrical
- B. Electronic
- C. Logic

II Electronic Drawing Types

- A. Schematic drawings
- B. Line drawings
- C. Printed circuit drawings
- D. Assembly drawings
- E. Pictorial drawings

III Electrical And Electronic
Drawing Construction

A. Sheet size selection
B. Layer information placement
C. Symbol library use
D. Proper symbol placement
E. Line font selection
F. Text placement

IV Editing Techniques

Course Description Form (continued)

METHOD OF EVALUATION: (Indicate how the competencies achieved will be translated into the grading system.)

To receive a grade a "A" the drawing, a final hard copy, must be of the highest quality. The drawing must not have any flaws in line contrast, absolute accuracy in dimensioning, and precise spacing of views and notes.

To receive a grade of "B" the drawing, a final hard copy, must have accurate dimensions, excellent line contrast, and reasonable spacing of views and notes.

To receive a grade of "C" the drawing, a final hard copy, has the minimum quality of technique; poorly spaced views, inaccurate structure of clarity of notes; lacks cleanliness, sharp corners, tangent points, and has long extension lines. Although the drawing exhibits sloppy technique, however, if the dimensions are accurate, this could be acceptable.

To receive a grade of "D" the drawing, a final hard copy, will exhibit overall poor quality. It has misleading descriptive notes, poor placement of views, and extra lines that add clutter to the drawing. This drawing may or may not meet the minimum requirements of acceptability in industry.

To receive a grade of "E" the drawing, a final hard copy, will show such unacceptable qualities as erroneous construction dimensions, views lacking proper alignment and an obvious lack of effort and understanding of what is minimum acceptable quality.

COURSE SYLLABUS: (This should be a companion document distributed to the students on the first day of class. It should include the Instructional Goals, Performance objectives and specific method of evaluation.)

Suggested Curriculum For
Drafting/Computer Aided Design

General Education

*English	6
Political Science	3
*Mathematics	8
Manufacturing	3
Metallurgy	6
Physics	8
Computer Programming	3
	37

*Placement based on student asset test scores.

Drafting

Basic Projection	3
Product Detailing	3
Descriptive Geometry	3
Tool Detailing	3
Die Design	3
Jig and Fixture Design	3
	18

Computer Aided Design Courses

Introduction to Computer Graphics	2
Three Dimensional Techniques	2
Three Dimensional Assemblies	2
Computer Graphics Applications	2
	8

DRAFTING/COMPUTER AIDED DESIGN (ASSOCIATE DEGREE)

The activities that directly support the work of engineers requires the assistance of individuals who possess both technical and scientific knowledge. The student is also competent using traditional drafting tools and is comfortable using new computer aided design drafting equipment. A design technician is an engineering assistant whose functions and duties require continual independent thinking along with oral, written and graphic communication. Continual involvement in the important procedure of mechanical design is predominate in the technician's daily activities. By refining and developing design ideas, the technician allows the engineer to devote his time to the field of design.

The student who satisfactorily completes the Drafting/Computer Aided Design curriculum qualifies for an Associate in Applied Science Degree.

FIRST YEAR

Fall Semester		Winter Semester	
DRFG 100	3	DRFG 104	3
CAD 100	2	CAD 110	2
MFG 102	3	*MATH ____	3
*MATH ____	5	MET 114	3
MET 102	3	COMPS 125	3
	16		14

Spring Term

DRFG 108	3
DRFG 112	3
	6

SECOND YEAR

Fall Semester		Winter Semester	
DRFG 240	3	DRFG 241	3
CAD 250	2	CAD 241	2
*ENG ____	3	*ENG ____	3
POL SCI ____	3	PHYS 182	4
PHYS 181	4		12
	15		

*Placement based on student asset test scores.

Suggested Curriculum For
Drafting/Computer Aided Drafting

General Education

*English	6
Political Science	3
*Mathematics	8
Manufacturing	9
Metallurgy	6
Physics	4
	36

*Placement based on student asset test scores

Drafting

Basic Projection	3
Product Detailing	3
Descriptive Geometry	3
Tool Detailing	3
Die Design	3
Jig and Fixture Design	3
	18

Computer Aided Design Courses

Introduction to Computer Graphics	2
Three Dimensional Techniques	2
Three Dimensional Assemblies	2
Computer Graphics Applications	2
	8

DRAFTING/COMPUTER AIDED DRAFTING (ASSOCIATE DEGREE)

The Computer Aided Drafting program is designed to prepare students for industrial drafting positions. The curriculum includes mathematics, physics and other related courses which prepare students for employment as detailers, tool layout drafters and detailers of special tools and fixtures. Included are the preparation of drawings for mechanical assemblies, subassemblies, detail drawings and product drawings. The curriculum includes extensive use of CAD equipment, work in the machine tool, and fabrication areas, all which aid the drafter in preparing for employment.

The student who satisfactorily completes the Drafting/Computer Aided Drafting curriculum qualifies for an Associate in Applied Science Degree.

FIRST YEAR

Fall Semester		Winter Semester	
DRFG 100	3	DRFG 104	3
CAD 100	2	CAD 110	2
*MATH ____	4	*MATH ____	4
MFG 102	3	MFG 103	3
MET 102	3	MET 114	3
	15		15

Spring Term

DRFG 108	3
DRFG 112	3
	6

SECOND YEAR

Fall Semester		Winter Semester	
DRFG 240	3	DRFG 241	3
CAD 250	2	CAD 241	2
*ENG ____	3	*ENG ____	3
PHYS 51	4	POL SCI ____	3
	12	MFG 210	3
			14

*Placement based on student asset test scores.

DRAFTING-TECHNICAL (ONE-YEAR CERTIFICATE)

The student will develop initial drafting board and CAD techniques that will prepare him or her for immediate employment as a drafter or detailer. Students may at anytime transfer into the Associate Degree Program.

The student who satisfactorily completes the Technical Drafting Certificate curriculum qualifies for a certificate of program completion.

FIRST YEAR

Fall Semester		Winter Semester	
DRFG 100	3	DRFG 104	3
CAD 100	2	CAD 110	2
*MATH ____	4	*MATH ____	4
MFG 102	3	MFG 210	3
	12		12

Spring Term

DRFG 108	3
DRFG 112	3
	6

*Placement based on student asset test scores

DRAFTING/ELECTRO-MECHANICAL (ONE YEAR CERTIFICATE)

Through this series of specialized courses the student will develop saleable skills in Computer Aided Drafting. The student may transfer at any time to an Associate Degree Program. Successful completion of the Electro-Mechanical Drafting curriculum qualfies the student for a certificate of program completion.

FIRST YEAR

Fall Semester		Winter Semester	
DRFG 100	3	DRFG 104	3
CAD 100	2	CAD 113	2
*MATH ____	5	MFG 210	3
ELECT 81	2	ELECT 111	5
	12		13

Spring Term

ELECT 126 3

*Placement based on student asset test scores

SCHOOLCRAFT COLLEGE PROGRAM EVALUATIONS

Schoolcraft College used the "MANAGER" system for final program evaluation. The Michigan Analaysis Network and General Evaluation Report system (MANAGER) has the potential for enabling Michigan community college educational leaders to: 1) enhance their process of management decisions resulting in greater institutional stability and 2) sucessfully account for the use of all resources. MANAGER can enable a college to institutionalize the planning procedure and to structure and refine college goals and program objectives through an understanding of: 1) valid data generated by Michigan Student Information System (MISIS), 2) perceptual information gathered by Program Review of Occupational Education (PROE), and, 3) financial data gathered by the Activities Classification Structure (ACS).

Schoolcraft College decision-making and program evaluation can be improved with common sense and a systematic review of outcome data; also, student and educational personnel perceptions can be demonstrated, program cost described, and implications of alternative plans envisioned.

The MANAGER system provides this approach to institutionalize an evaluative environment so the entire organization can better analyze information pointedly and regularly. It is this college's intention to begin to fully evaluate this program after two-years of operation, about September 1988.

SCHOOLCARFT COLLEGE CURRICULUM INSTRUCTION COMMITTEE

Schoolcraft College uses committee oriented planning procedures to identify, describe, propose, and review all new programs. A curriculum instruction committee, composed of a cross-section of various college divisional employees, initially proposes programs, which in turn are researched and reviewed by various subcommittees. This entire planning process includes checks and balances to insure that existing or anticipated college resources, talent, facilities, academic goals, and community needs are all considered. Time lines for proper program inceptions are monitored to insure quality course construction and development, college catalog entry, articulation, information dissemination and inclusion of data into all appropriate state reports. This entire process consumes about eight months and is repeated annually.

MINUTES OF THE DRAFTING ADVISORY COMMITTEE MEETING
Tuesday, November 27, 1984
W-260, 1:30 p.m.

MEMBERS PRESENT: Arthur, Campbell, Tenniswood, VonGlahn, Feenstra, Bigos
MEMBERS ABSENT: Gasior, deAvila
MEMBERS EXCUSED: Biet, O'Connor

GUESTS: D.S. Doyle (representing Mr. O'Connor), Mark Ziemba

Meeting was called to order at 1:32 p.m. by temporary Chairman Feenstra.

Nominations for Chairperson to replace Carl Baum were called for. It was moved by Arthur, supported by VonGlahn, to nominate Clayton Tenniswood as Chairperson of the Advisory Committee. There being no further nominations, it was moved by VonGlahn, supported by Arthur, to close nominations. Motion to close nominations passed. The vote on the Chairperson was unanimous. At this time, Mr. Tenniswood chaired the remainder of the meeting.

AGENDA ITEM #1 - ROSTER REVISION
The roster was appropriately revised and copies are to be sent to Dr. Jeffress, Dr. Reibling and Dr. Monfette. Dick Arthur indicated a suitable replacement for Carl Baum would be Mr. Jack Arthurs of Bra-Con Industries in Livonia.

ACTION ITEM - Feenstra to contact and make recommendations to the President.

AGENDA ITEM #2 - SELECTION OF CHAIRPERSON
Completed upon onset of meeting.

AGENDA ITEM #3 & #4 - NEW PROGRAM / CAD
At the previous meeting of December 6th, 1983, it was promised that we would submit to the Committee, revised program goals which would incorporate CAD. After discussion, it was moved by Arthur, supported by VonGlahn to accept the four revised program goal statements and the new CAD Associate Degree goal statements, and the Drafting Five-Year Plan. It was discussed by the group that "lots of good work" went in the goals. The Committee would like to see further work on courses in CAD; namely 215, 225, 235 and 245. Motion passed unanimously.

ACTION ITEM - New programs & new courses to be submitted to the Committee & to C.I.C.

AGENDA ITEM #5 - Course Revision
Present courses must be revised to include topics on CAD. The faculty also have to write course descriptions and course syllabi for Drafting 215, 225, 235 and 245. There has to be a relationship between CAD and Computer Integrated Manufacturing or Computer Assisted Manufacturing.

At this time, Mark Ziemba from Career Planning & Placement, informed the Advisory Committee of his role in finding adequate employment for drafters. Mark also accompanied the committee to a Fastdraft demonstration so that he would be in a better position to inform employers of these new skills our students are gaining.

AGENDA ITEM #6 - DEMONSTRATION OF FASTDRAFT
The Committee, with guests, retired to the Fastdraft area for a demonstration by two freshman students.

Meeting adjourned at the Fastdraft area at 4:05 p.m.

/vmk

MINUTES OF THE DRAFTING ADVISORY COMMITTEE MEETING
February 10, 1983, 2:00 p.m., A-520

MEMBERS PRESENT: Arthur, Bist, Tenniswood, VonGlahn, Feenstra, Baum, Bigos, deAvila
MEMBERS ABSENT: Gasior, O'Connor
MEMBERS EXCUSED: Campbell

Meeting was called to order by Chairman Arthur at 2:02 p.m.

AGENDA ITEM #1 - ROSTER REVISION
The roster was revised as necessary.

AGENDA ITEM #2 - THREE PHASE CAD PROGRAM
Committee discussed at length the three phases for the acquisition of space and equipment for Computer Assisted Drafting & Design. The Advisory Committee advises not to lose site of the basic skills which will always be required as the computer only augments the design process. Faculty will seek current information from the Advisory Committee as the three phases are planned. Twelve work stations ($13,000 per station estimated) were recommended for the area between T-110 & 120. The arrangement whould be such that the graphics lab does not interfere with the teaching in adjacent rooms.

AGENDA ITEM #4 - EQUIPMENT NEEDS FOR PHASE TWO & THREE (Possible industry donations)
The discussion of phase two equipment needs centered on the $30,000 to purchase a "COM CODE ED CAD SYSTEM". Mr. deAvila indicated that he had entered into preliminary discussions with the Apple Computer Corporation on the west coast to acquire a twelve station industrial CAD system. The net worth of such an acquisition would be $600,000 to $750,000. The benefit to Apple Computer would be a Michigan site for an industrial installation and also a training site for seminars and other industrial involvement with business & industry. The college would benefit by having an up-to-date industrial station second to none in Michigan. The work station should have capability to make standard orthographic views, drawing with light pen on CRT, produce a hard copy of drawing and store & retrieve information. Not needed are isometric drawings, perspective drawings, rotation capability or graphs.

AGENDA ITEM #5 - STAFF CHANGES
Staff changes were discussed and the committee commended the staff member for a job well done emphasizing his dedication and professionalism and his excellent designing skills. A replacement for this faculty member will have to be realized in order to continue offering a quality drafting and design program.

AGENDA ITEM #6- GOALS & OBJECTIVES
The goals of the department are to fully integrate the computer into the drafting classes and to share this equipment with the Architectural program. The committee's goal is to each submit a new members' name for recommendation to be added to the committee since it was discussed that some new blood is a most needed ingredient.

AGENDA ITEM #3 - DEMONSTRATION OF PHASE ONE GENE HIRS EQUIPMENT
At this time, the committee cleaned up the conference room, A-520, and went to the T-112 drafting area to watch Mr. Bigos put the phase one unit (Gene Hirs Endowment) through its paces. Mr. Bigos demonstrated the following points and also indicated that typing is not mandatory, althouth some skill is helpful. Basic drawing skills, traditional pencil drawing skills; he stated that binary code, data base information & basic programming take the mystery out of the computer; use of software; also important is self reliance for learning. It has been stated that two weeks of instructional teaching is followed by 9 to 12 months of practice at the terminal to develop proficiency.

Meeting adjourned at 4:45 p.m.

BEST COPY AVAILABLE

MINUTES OF THE CITIZENS ADVISORY COMMITTEE FOR DRAFTING
PLACE: ROOM T-310
TIME: 2:00 PM
DATE: DECEMBER 3, 1981

MEMBERS PRESENT: R. Arthur, C. Baum, L. Bigos, G. de Avila, F. Feenstra, J. Gasior, M. O'Connor, C. Tenniswood, W. Von Glahn

Mr. Carl Baum, temporary chairperson, called the meeting to order at 2:00 p.m. in Room T-310, Technical Building.

ITEM NO. 1 - Roster Revision

Corrections and revisions to the roster were noted. Mr. G. de Avila was introduced to the advisory committee.

ITEM NO. 2 - Review Textbooks

Drafting 051 instructors expressed the need of a textbook, in addition to the workbook for the course. No discussion was made but to continue to search for a more adequate book.

ITEM NO 3 - P.R.O.E.

P.R.O.E. comments by Fern Feenstra

ITEM NO 4 - Advance Placement

An extensive discussion on the subject by the entire commitee, points expressed:

a. A need for a uniform testing procedure

b. College catalog has adequate guidelines

c. Tests used in advanced placement were examined by the committee and approved of the procedure

d. Our counseling staff often misplaces drafting students, we need to correct this somehow

ITEM NO. 5

Mr. Feenstra invited the advisory committee to visit, after the meeting, Room T-100, formally a drafting room, now a data processing room.

ITEM NO. 6

Mr. M. O'Connor nominated R. Arthur as chairperson. The committee seconded the nomination.

ITEM NO 7

Leo Bigos volunteered to serve as secretary.

The meeting adjourned at 4:45 p.m.

Recorder - L. J. Bigos

MINUTES

CITIZENS ADVISORY COMMITTEE
FOR DRAFTING

February 17, 1981

MEMBERS PRESENT: R. Arthur, C. Baum, L. Bigos, D. Campbell, G. Cavanaugh, F. Feenstra, J. Gasior, M. O'Connor, C. Tenniswood, W. VonGlahn, H. Walrod

ABSENT : G. deAvila

EXCUSED: A. Bist

Mr. Howard Walrod, chairperson, called the meeting to order at 2:00 p.m. in room T120, Technical Building.

Agenda Item No. 1 - Old Business and Roster Revisions
Corrections and revisions to the roster were noted.

Agenda Item No. 2 - P.R.O.E.
Mr. Feenstra passed out the P.R.O.E. booklets and informed the committee they would be involved.

Agenda Item No. 3 - New Equipment Review
Approved equipment to be budgeted.

Agenda Item No. 4 - Computer Drafting
Mr. O'Connor remarked about the importance of computer graphics. Some of the comments were: (1) The need is already here, (2) the importance of schools to familiarize students with the software, (3) to identify persons that can adapt themselves to this kind of work. Mr. O'Connor made a motion that a computer graphics terminal be made available for our drafting students. Seconded by Bill VonGlahn. Motion passed unanimously.
Action Item - Mr. Feenstra to pursue the matter as to kind of terminal, the cost, and installation of such, and prepare a progress report at the next advisory committee meeting.

The minutes of the last meeting were approved.

The meeting was adjourned at 3:17 p.m., motion by L. J. Bigos, seconded by G. Cavanaugh.

Recorder - L. J. Bigos

DRAFTING ADVISORY COMMITTEE MEETING MINUTES
DATE: DECEMBER 6, 1983
TIME: 2:00 P.M.
PLACE: A-520

MEMBERS PRESENT: Arthur, Campbell, Gasior, O'Connor, Tenniswood, Von Glahn, Feenstra, Baum, Bigos, DeAvila
MEMBERS ABSENT: Bist

Meeting was called to order at 2:10 p.m.

AGENDA ITEM #1: ROSTER REVISION
Minutes of the February 10, 1983 meeting were approved and the roster was revised as necessary.

AGENDA ITEM #2: C.A.D. EQUIPMENT
Mr. Bigos presented the attributes of a number of systems. His newest investigation centers around the TERAK system. Mr. DeAvila continues to contact major computer manufacturers and has contacted Ford and General Motors for donations for a four station "3-D" C.A.D. system valued at $720,000 but available to the College for $300,000.

The Drafting department wishes to integrate C.A.D. into existing courses utilizing open labs since the program is for a four station unit.

It was moved by Baum, supported by Casior and unanimously adopted that the Advisory Committee urge that efforts to obtain a C.A.D. system before a "3-D" system only in order to approximate industrial conditions and to avoid early obsolescence.

ACTION ITEM: F. Feenstra to contact the Office of Instruction to make them aware of the faculty and advisory committee recommendations.

AGENDA ITEM #3 PROGRAM GOALS AND OBJECTIVES
Faculty will prepare program goals for the next meeting. If a survey vehicle is required they will contact Mr. Meznek for assistance. All will assist in developing the goals which are to include C.A.D.

AGENDA ITEM #4 COURSE GOALS AND OBJECTIVES
Once the program goals are written it will be an easier task to develop course goals.

AGENDA ITEM #5 OLD BUSINESS
Mr. Bigos thanked Mr. O'Connor for arranging the six weeks C.A.D. training and six weeks actual work experience this past summer at Cadillac Motor on the computer graphics systems. He was able to log over 300 hours on the Computer Vision system. It was asked if Cadillac Motor could make the same internship available to Mr. DeAvila for the forthcoming Spring/Summer session. Discussion will take place on this matter in February by Cadillac Motor and the College.

AGENDA ITEM #6: NEW BUSINESS
D. Arthur indicated that he is retiring in January and would remain a member of the committee, however, he felt obligated to resign as the Drafting Chairman. It was moved by Tenniswood, supported by Campbell, and unanimously adopted that Carl Baum be elected as Chairman of the Drafting Advisory Committee.